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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,000	02/22/2002	Kazuo Ohnishi	134.140	1725

7590 10/17/2002  
NILLES & NILLES, S.C.  
INTELLECTUAL PROPERTY ATTORNEYS  
FIRSTAR CENTER, SUITE 2000  
777 EAST WISCONSIN AVENUE  
MILWAUKEE, WI 53202-5345

EXAMINER

NGUYEN, HANH N

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 10/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/082,000

Applicant(s)

OHNISHI ET AL.

Examiner

Nguyen N Hanh

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: In the "Description of the preferred embodiments" section, no drawings are referenced with regard to the numerous embodiments described. However, the "Description of the prior art" section includes a description, explanation, tables and discussion of all the figures. It is not clear which part is the prior art and which part is the present invention. Appropriate correction is required.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "a tooth width ratio of the small rotor teeth and the small stator teeth is set to 0.36-0.44 (or the width of the stator teeth is much greater than the width of the rotor teeth)" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art.

Regarding claim 1, Applicant's admitted prior art discloses a three-phase hybrid type stepping motor comprising a stator, and a rotor arranged concentrically with the stator and with an air gap therebetween, said stator having an annular stator yoke, six stator poles extending radially and formed at a regular pitch on the inner peripheral surface of the annular stator yoke, and stator windings of three-phase each wound around each stator pole, each of said stator poles having a plurality of small stator teeth at the tip end thereof, said rotor having two splitted rotor elements and a permanent magnet held therebetween and magnetized so as to form N and S poles in the axial direction thereof. and a plurality of small rotor teeth formed at a regular pitch on the outer peripheral surface of each of said rotor elements, said two splitted rotor elements being shifted from each other in angular position by a  $1/2$  pitch of the small rotor teeth (see the specification, page 1, lines 14-25 and Fig. 1a-2c) a permeance distribution of the small stator teeth is a vernier pitch balanced by a six order harmonic wave (page 2, lines 10-13). Applicant's admitted prior art fails to show a tooth width ratio of the small rotor teeth with the small stator teeth is set to 0.35 - 0.45.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Applicant's admitted prior art by providing a hybrid stepping motor wherein a tooth width ratio of the small rotor teeth with the small stator teeth is set to 0.35 - 0.45 since it has been held that where the general conditions of a

claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

4. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Harned.

Regarding claim 2, Applicant's admitted prior art discloses a three-phase hybrid type stepping motor comprising a stator, and a rotor arranged concentrically with the stator and with an air gap therebetween, said stator having an annular stator yoke, six stator poles extending radially and formed at a regular pitch on the inner peripheral surface of the annular stator yoke, and stator windings of three-phase each wound around each stator pole, each of said stator poles having a plurality of small stator teeth at the tip end thereof, said rotor having two splitted rotor elements and a permanent magnet held therebetween and magnetized so as to form N and S poles in the axial direction thereof, and a plurality of small rotor teeth formed at a regular pitch on the outer peripheral surface of each of said rotor elements, said two splitted rotor elements being shifted from each other in angular position by a  $1/2$  pitch of the small rotor teeth (see the specification, page 1, lines 14-25 and Fig. 1a-2c) a permeance distribution of the small stator teeth is a vernier pitch balanced by a six order harmonic wave.

Applicant's admitted prior art fails to show the small stator teeth is a vernier pitch balanced by a three order harmonic wave and a tooth width ratio of the small rotor teeth with the small stator teeth is set to 0.35 - 0.45.

However, Harned discloses a stepping motor wherein the small stator teeth is a vernier pitch balanced by a three order harmonic wave (Fig. 1 and Col. 2, lines 32-35) for the purpose of reducing detent torque

Since the Applicant's admitted prior and Harned are in the same field of endeavor, the purpose disclosed by Harned would have been recognized in the pertinent art of the Applicant's admitted prior art.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify the Applicant's admitted prior art by introducing vernier pitch balanced by a three order harmonic wave as taught by Harned for the purpose of reducing detent torque.

Moreover, the limitation "a tooth width ratio of the small rotor teeth with the small stator teeth is set to 0.35 - 0.45" is given little patentable weight since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claims 3 and 4, the Applicant's admitted prior art discloses the invention except for showing a three-phase hybrid wherein a number of the small rotor teeth is fifty, a number of the small stator teeth is eight, a tooth pitch is 7.05, and a tooth width ratio of the small rotor teeth with the small stator teeth is set to 0.36 - 0.44.

However, Harned discloses a stepping motor wherein the ratio of the small rotor teeth small stator teeth is 50/48 (Col. 2, lines 25-32) for the purpose of reducing detent torque

Since the Applicant's admitted prior and Harned are in the same field of endeavor, the purpose disclosed by Harned would have been recognized in the pertinent art of the Applicant's admitted prior art.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify the Applicant's admitted prior art by introducing six stator poles, each with eight small stator teeth as taught by Harned for the purpose of reducing detent torque.

Moreover, the limitations "a tooth pitch is 7.05" and "a tooth width ratio of the small rotor teeth with the small stator teeth is set to 0.35 - 0.45" are given little patentable weight since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Satomi.

Regarding claim 5, the Applicant's admitted prior art shows all limitations of the claimed invention except showing a three-phase hybrid motor wherein the three-phase windings of the stator are connected in the form of delta.

However, Satomi discloses a three-phase hybrid motor wherein the three-phase windings of the stator are connected in the form of delta (Fig. 6b) for the purpose of reducing switching elements (Col. 4, lines 47-55).

Since the Applicant's admitted prior and Satomi are in the same field of endeavor, the purpose disclosed by Satomi would have been recognized in the pertinent art of the Applicant's admitted prior art.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Applicant's admitted prior art by using delta connection as taught by Satomi for the purpose of reducing switching elements.

6. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Harned and further in view of Satomi.

Regarding claim 6-8, the Applicant's admitted prior art and Harned show all limitations of the claimed invention except showing a three-phase hybrid motor wherein the three-phase windings of the stator are connected in the form of delta.

However, Satomi discloses a three-phase hybrid motor wherein the three-phase windings of the stator are connected in the form of delta (Fig. 6b) for the purpose of reducing switching elements (Col. 4, lines 47-55).

Since the Applicant's admitted prior, Harned and Satomi are in the same field of endeavor, the purpose disclosed by Satomi would have been recognized in the pertinent art of the Applicant's admitted prior art and Harned.

It would have been obvious at the time the invention was made to a person having an ordinary skill in the art to modify Applicant's admitted prior art and Harned by using delta connection as taught by Satomi for the purpose of reducing switching elements.

### ***Conclusion***



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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh N Nguyen whose telephone number is (703) 305-3466. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

HNN

October 9, 2002



NESTOR RAMIREZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800